

This listing of claims will replace all prior versions and listings of claims in this application.

1 (currently amended). A method of producing a spunbonded nonwoven fabric comprising the steps of:

forming, in an extruder, a melt blend of at least one polymer and, additionally at least one antistatic agent present in an amount sufficient such that the static level measured at about one half inch below the outlet of a slot attenuation device is between -2 kilovolt per inch and 2 kilovolt per inch,

extruding said blend in the form of a plurality of filaments,

directing the filaments through the slot attenuation device,

drawing the filaments to orient them,

depositing the filaments onto a collection surface to form a web, and

bonding the filaments of the web;

wherein the filaments of the web are bonded at a temperature of between 180°C and about 250°C;

wherein the static level measured at about one half inch below the outlet of the slot attenuation device is between -2 kilovolt per inch and 2 kilovolt per inch; ~~and~~

wherein, without addition of the at least one antistatic agent, a static level measured at about one half inch below the outlet of the slot attenuation device is greater than 2 kilovolt per inch or less than -2 kilovolt per inch; and

wherein the at least one antistatic agent does not cause a defect in the spunbonded nonwoven fabric.

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2 (original). The method, according to claim 1, wherein the filaments comprise nylon, polyester, acrylic, polyethylene, polypropylene, polybutylene terephthalate, poly(trimethylene terephthalate), or polylactic acid polymers; or a combination of these polymers.

3 (original). The method, according to claim 2, wherein the filaments comprise nylon 6; nylon 6,6; nylon 6,10; nylon 6,12; nylon 11; nylon 12; or nylon copolymers; or a combination of these nylon polymers.

4 (original). The method, according to claim 1, wherein said method utilizes two or more melt blends of polymer.

5 (previously presented). The method, according to claim 1, wherein, without addition of the at least one antistatic agent, a static level measured at about one half inch below the outlet of the slot attenuation device is greater than 4 kilovolt per inch or less than -4 kilovolt per inch.

6 (canceled).

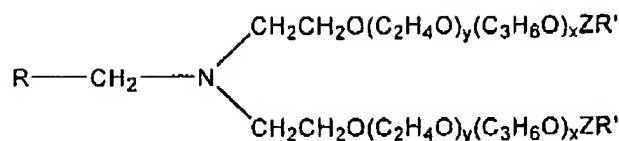
7 (withdrawn). The method, according to claim 1, wherein said method utilizes an antistatic material comprising an agent selected from the group consisting of: saccharine; quarternary ammonium salts; homo- and co-polymers of epihalohydrin; N,N,-Bis(hydroxyethyl) alkylamine; chain extended polyoxiranes; aromatic sulfanomides; styrene polymers; the copolymerization product of ethylene oxide with a heterocyclic monomer or vinyl type monomer; low molecular weight polyether oligomers; carbon particles; trineoalkoxy amino zirconate; trineoalkoxy sulfonyl zirconate; and compounds of the general formula

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wherein R is a C₁₋₉ alkyl group or hydrogen, Z is a difunctional chain modifier group, R' is a C₁₋₄ alkyl group or hydrogen and x and y are between about 10 and about 50.

8 (withdrawn). The method, according to claim 7, wherein R is a C₁₋₅ alkyl group or hydrogen, Z is a difunctional chain modifier group, R' is a C₁₋₄ alkyl group or hydrogen and x and y are each between about 20 and about 40.

9 (withdrawn). The method, according to claim 1, wherein said antistatic agent comprises ethylene oxide and at least one heterocyclic co-monomer.

10 (original). The method, according to claim 1, wherein said antistatic agent comprises at least one polar organic compound having at least 5 carbon atoms and a compound having at least 3 heteroatoms.

11 (previously presented). The method, according to claim 10, wherein the antistatic agent comprises one or more of the group consisting of polyethers, crown ethers, polyols, polyimines, polyamines, polymers derived from pyridine, macrocyclic aza compounds, polysulfides and polyphosphines, and salts of protic acids that are solvated or complexed in a polar organic compound.

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12 (canceled).

13 (original). The method, according to claim 1, wherein the static level measured at about one half inch below the outlet of the slot attenuation device is between about -1 kilovolt per inch and about 1 kilovolt per inch.

14 (original). The method, according to claim 1, wherein at least about 5% of the surface area of each filament is made of a nylon polymer.

15 (original). The method, according to claim 1, wherein at least about 5% of the total surface area of all filaments is made of a nylon polymer.

16 (previously presented). The method, according to claim 1, wherein said antistatic agent comprises polycaprolactum, a sulfonic acid, a C₁₀-C₁₈ alkane, and sodium salts.

17 (currently amended). A method of producing a spunbonded nonwoven fabric comprising the steps of:

forming one or more melt blends of polymer and, additionally, one or more antistatic agents either in a master batch or a base resin present in an amount sufficient such that the static level measured at about one half inch below the outlet of a slot attenuation device is between -2 kilovolt per inch and 2 kilovolt per inch,

extruding said blend or blends through separate extruders into the form of a plurality of multicomponent filaments with the blend or blends of polymer and one or more antistatic agents forming a portion of the surface of the filaments,

directing the filaments through the slot attenuation device,

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drawing the filaments to orient them,
depositing the filaments onto a collection surface to form a web, and
bonding the filaments of the web;
wherein the filaments of the web are bonded at a temperature of between 180 °C and about 250 °C;

wherein the static level measured at about one half inch below the outlet of the slot attenuation device is between -2 kilovolt per inch and 2 kilovolt per inch; and

wherein, without addition of the at least one antistatic agent, a static level measured at about one half inch below the outlet of the slot attenuation device is greater than 2 kilovolt per inch or less than -2 kilovolt per inch; and

wherein the at least one antistatic agent does not cause a defect in the spunbonded nonwoven fabric.

18 (original). The method according to claim 17, wherein the filaments comprise nylon, polyester, acrylic, polybutylene terephthalate, polyethylene, polypropylene, ethylene vinyl alcohol, polyvinyl alcohol, vinyl acetate, poly(trimethylene terephthalate), or polylactic acid polymers; or a combination of these polymers.

19 (original). The method, according to claim 17, wherein the filaments comprise nylon 6; nylon 6,6; nylon 6,10; nylon 6,12; nylon 11; nylon 12; or nylon copolymers; or a combination of these nylon polymers.

20 (previously presented). The method, according to claim 17, wherein, without addition of the at least one antistatic agent, a static level measured at about one half inch below

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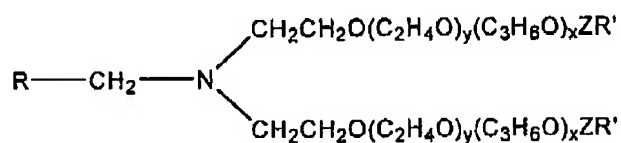
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the outlet of the slot attenuation device is greater than 4 kilovolt per inch or less than -4 kilovolt per inch.

21 (canceled).

22 (withdrawn). The method, according to claim 17, wherein said method utilizes an antistatic material comprising an agent selected from the group consisting of: saccharine; quarternary ammonium salts; homo- and co-polymers of epihalohydrin; N,N-Bis(hydroxyethyl) alkylamine; chain extended polyoxiranes; aromatic sulfanomides; styrene polymers; the copolymerization product of ethylene oxide with a heterocyclic monomer or vinyl type monomer; low molecular weight polyether oligomers; carbon particles; trineoalkoxy amino zirconate; trineoalkoxy sulfonyl zirconate; and compounds of the general formula



wherein R is a C₁₋₉ alkyl group or hydrogen, Z is a difunctional chain modifier group, R' is a C₁₋₄ alkyl group or hydrogen and x and y are between about 10 and about 50.

23 (withdrawn). The method, according to claim 22, , wherein R is a C₁₋₅ alkyl group or hydrogen, Z is a difunctional chain modifier group, R' is a C₁₋₄ alkyl group or hydrogen and x and y are each between about 20 and about 40.

24 (canceled).

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25 (original). The method, according to claim 17, wherein the static level measured at about one half inch below the outlet of the slot attenuation device is between about -1 kilovolt per inch and about 1 kilovolt per inch.

26 (original). The method, according to claim 17, wherein at least about 5% of the surface area of each filament is made of a nylon polymer.

27 (withdrawn). The method, according to claim 22, wherein at least about 5% of the total surface area of all filaments is made of a nylon polymer.

28 (previously presented). The method, according to claim 17, wherein said antistatic agent comprises polycaprolactum, a sulfonic acid, a C₁₀-C₁₈ alkane, and sodium salts.

29-34 (canceled).

35 (currently amended). A method of producing a spunbonded nonwoven fabric comprising the steps of:

forming, in an extruder, a melt blend of at least one polymer

extruding said blend in the form of a plurality of filaments,

directing the filaments through the slot attenuation device and drawing the filaments to orient them,

depositing the filaments onto a collection surface to form a web, and

bonding the filaments of the web;

wherein the filaments of the web are bonded at a temperature of between 180°C and about 250°C; and

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wherein the method further comprises adding to the melt blend, before extruding said blend, at least one antistatic agent in an amount sufficient to reduce the static level measured at about one half inch below the outlet of the slot attenuation device from greater than 2 kilovolt per inch or less than -2 kilovolt per inch to between -2 kilovolt per inch and 2 kilovolt per inch; and

wherein the at least one antistatic agent does not cause a defect in the spunbonded nonwoven fabric.

36 (previously presented). The method according to claim 35, wherein the at least one antistatic agent is added in an amount sufficient to reduce the static level measured at about one half inch below the outlet of the slot attenuation device from greater than 4 kilovolt per inch or less than -4 kilovolt per inch to between -2 kilovolt per inch and 2 kilovolt per inch.

37 (currently amended). A method of reducing the static level of a spunbond process having a static level measured at the outlet of a slot attenuation device of greater than 2 kilovolt per inch or less than -2 kilovolt per inch, wherein the method comprises:

adding at least one antistatic agent to a melt blend of the spunbond process, before extruding the melt blend, in an amount sufficient such that the static level measured at about one half inch below the outlet of the slot attenuation device is between -2 kilovolt per inch and 2 kilovolt per inch;

wherein the at least one antistatic agent does not cause a defect in a spunbonded nonwoven fabric produced by the spunbond process.

38 (previously presented). The method according to claim 37, wherein the method comprises adding the at least one antistatic agent to the melt blend of the spunbond process in

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an amount sufficient such that the static level measured at about one half inch below the outlet of the slot attenuation device is between -1 kilovolt per inch and 1 kilovolt per inch.

39 (previously presented). The method according to claim 37, wherein the static level of the spunbond process being reduced, measured at the outlet of a slot attenuation device, is greater than 4 kilovolt per inch or less than -4 kilovolt per inch.

40 (previously presented). The method according to claim 39, wherein the method comprises adding the at least one antistatic agent to the melt blend of the spunbond process in an amount sufficient such that the static level measured at about one half inch below the outlet of the slot attenuation device is between -1 kilovolt per inch and 1 kilovolt per inch.

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